IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claims 14 and 20-22 and AMEND claims 10, 15, 17 and 24 in accordance with the following:

1-9 (cancelled)

10. (currently amended) A method for pre-filtering training sequences used for a channel estimation of radio transmission characteristics in a radio communication system, in which an antenna arrangement having a plurality of antenna elements is used on a transmit side, comprising:

feeding the training sequences via a pre-filter to the antenna elements on the transmit side;

receiving the training sequences after transmission and using the training sequences to estimate radio transmission characteristics, which are described by spatial correlations,

using the pre-filter to adjust the training sequences to the radio transmission channel characteristics, to thereby improve the channel estimation;

dimensioning the pre-filter as a function of the spatial correlations to achieve a predefined error value of an algorithm used for channel estimation, wherein the training sequences are pre-filtered based on the following equation:

$$F \cdot S = V_{Tx}^{*} \Phi_f S$$

where:

S is a transmit-side training sequence matrix,

F is a transmit-side pre-filter matrix,

V_{Tx} are eigenvectors of a transmit-side correlation matrix formed of transmit-side radio channel coefficients having long-term stability, and

Φ_f is a diagonal matrix for power assignment.

11. (previously presented) The method according to claim 10, wherein

the predefined error value is a receive-side error value, and

the predefined error value is a minimum error value which is defined based on a length of

the training sequences, or the predefined error value is achieved by adjusting the length of the training sequences.

12. (previously presented) The method according to claim 10, wherein an MSE algorithm is used to estimate the radio channel characteristics on a receive side.

13. (previously presented) The method according claim 10, wherein

a beam forming method is implemented by the pre-filter for every training sequence, and

in the beam forming method, the pre-filter assigns both a power and an antenna element to each training sequence.

14. (cancelled)

15. (currently amended) The method according to claim ~~14~~10, wherein the diagonal matrix Φ_f is formed based on an MSE error value ε using the following formula:

$$\varepsilon = tr(\Lambda_{Tx}^{-1} \otimes \Lambda_{Rx}^{-1} + \frac{N_t}{N_0}(\Phi_f \Phi_f^H \otimes I))^{-1}$$

where

N_t is a training sequence length,

N_0 is a noise power,

I is the identity matrix,

Λ_{Rx} are eigenvalues of a receive-side correlation matrix formed of receive-side radio channel coefficients having long-term stability,

Λ_{Tx} are eigenvalues of the transmit-side correlation matrix formed of transmit-side radio channel coefficients having long-term stability.

16. (previously presented) The method according to claim 15, wherein the MSE error value ε is minimized for a transmit-side and a receive-side correlation of radio transmission channels or antenna elements in respect of the diagonal matrix Φ_f based on the following formula:

$$\underbrace{\min}_{\Phi_f} \; tr\left(\Lambda_{Tx}^{-1} \otimes \Lambda_{Rx}^{-1} + \frac{N_t}{N_0}\left(\Phi_f \Phi_f^H \otimes I\right)\right)^{-1}$$

with a power restriction being defined as a secondary condition based on the following formula:

$$\rho = \sum_{l=0}^{M_{Tx}} \Phi_{f,l}^2$$

17. (currently amended) The method according to claim ~~14~~10, wherein the following applies for a transmit-side correlation of radio transmission channels or antenna elements of the diagonal matrix Φ_f:

$$\Phi_{f,l} = \left[\frac{1}{M_{Tx}}\left(\left(\frac{N_t}{N_0}\right)^{-1} tr(\Lambda_{Tx}^{-1}) + \rho\right) \cdot I - \left(\frac{N_t}{N_0}\right)^{-1} \Lambda_{Tx}^{-1}\right]^{0,5}$$

with a secondary condition $\Phi_{f,l} \geq 0$.

18. (previously presented) The method according to claim 11, wherein an MSE algorithm is used to estimate the radio channel characteristics on a receive side.

19. (previously presented) The method according claim 18, wherein

a beam forming method is implemented by the pre-filter for every training sequence, and

in the beam forming method, the pre-filter assigns both a power and an antenna element to each training sequence.

20-22. (cancelled)

23. (previously presented) A transmit station and/or a receive station of a radio communication system with means, which are embodied to implement the method according to claim 10.

24. (currently amended) A transmitter to pre-filtering training sequences used for estimating radio transmission characteristics in a radio communication system, comprising:

an antenna system comprising a plurality of antenna elements to transmit training sequences; and

a pre-filter through which the training sequences are fed before transmission by the antenna system, the pre-filter being dimensioned as a function of spatial correlations of the antenna elements, to achieve a predefined error value in an algorithm used for channel estimation, wherein the training sequences are pre-filtered based on the following equation:

$$F \cdot S = V_{Tx}^{*} \Phi_f S$$

where:

S is a transmit-side training sequence matrix,

F is a transmit-side pre-filter matrix,

V_{Tx} are eigenvectors of a transmit-side correlation matrix formed of transmit-side radio channel coefficients having long-term stability, and

Φ_f is a diagonal matrix for power assignment.